

REMARKS

The claim of priority to a prior provisional application has been added to the application on page 1 as the first sentence, to respond to the examiner's objection to the specification.

Claims 1-16 were presented in the application, the examination referenced only claims 1-15, it is assumed in this response that this is a clerical error and that the examination includes 16 when 15 is recited.

The claims have been amended to more clearly point out the claimed invention in all of the claims which is the addition of HCN to an LCN fraction as a plug which is recovered and recycled to be used as a solvent so that the distillation column reactor may be operated at higher temperatures and still have boiling material in the catalyst bed. (Summary at page 3 lines 30-33).

The rejection of claims 1 and 3-15 under 35 USC 1-3(a) as unpatentable over Hearn et al (U.S. 5,597,476) is respectfully traversed. Hearn discloses desulfurization in which naphtha is fed to a first distillation column reactor which acts as a depentanizer or dehexanizer with the lighter material containing most of the olefins and mercaptans being boiled up into a first distillation reaction zone where the mercaptans are reacted with diolefins to form sulfides which are removed in the bottoms along with any higher boiling sulfur compounds and the bottoms are subjected to hydrodesulfurization in a second distillation column reactor where the sulfur compounds are converted to H₂S and removed. However, as the examiner correctly observes among the several

omissions of significant elements from this reference is the omission of adding a heavy cracked naphtha to any stream let alone adding the HCN to a light cracked naphtha. Specially the Hearn invention is, " ...that the sulfur is removed from the light olefin portion of the stream to a heavier portion of the stream without any substantial loss of olefins." (Spec. col. 2, lines 21-24). The invention in the present invention is the means (the HCN recycle plug) of converting the sulfur compounds in the lighter fraction into H₂S, but it does not involve the removal of sulfur compounds into the heavier portion of the naphtha. The thioetherification steps that are recited in claims 3-14 are prior steps to the invention. Thus, in these claims the use of the recycle plug of HCN is the distinguishing element not found in the art.

The examiner urges that the Hearn figure shows return of a portion of the bottoms to the column. As the examiner must appreciate, as in most distillation columns there is a reboiler (50) which is used to heat balance in the bottom of the column. The present claims have been amended to recite that " recycling said heavy cracked naphtha to said distillation reaction zone along with said first higher boiling naphtha fraction, whereby the heavy cracked naphtha is used as a solvent so that the distillation column reactor may be operated at higher temperatures and still have boiling material in the catalyst bed", which describes a different location of the recycle and a different function than that of a reboiler (the bottoms being a convenient means of adjusting the heat to the column).

The examiner postulates that adding a HCN to a higher boiling fraction of Hearn

would necessarily remove unwanted sulfur compounds from both the heavy fraction and the HCN providing a greater amount of desulfurized product. The other points noted as incentives or reasons for combining disparate teachings found within Hearn relate to dependent claims and not to the independent claims 1, 3, 6 and 15, which now all clearly recite the recycling plug of HCN and the reason for the plug. Since this is an invention, there is no suggestion in Hearn to do this and the examiner's rationale to make out a *prima facie* case of obviousness must fail.

"Obviousness cannot be established by combining teachings of the prior art to produce the claimed invention, *absent* some teaching suggestion or incentive supporting the combination." *In re Geiger*, 2 USPQ2d 1276 (CAFC 1987) See also *In re Fine*, 5 USPQ2d 1596 and *Ex parte Levensgood*, 28 USPQ2d 1300 (BdPatApp 1993). Hence, without the requisite teaching, suggestions or incentives there is no *prima facie* case and the rejection must fail. The incentive that the HCN will remove the unwanted sulfur compounds is without merit, since the HCN in the claimed invention is going into a column where the **sulfur compounds** in the LCN feed will be **destroyed** by converting them to H₂S and hydrocarbons. The H₂S is a gas which leaves in the overheads, not in the bottoms where the HCN is, and is easily separated from the hydrocarbons. Thus, this part of the rationale does not provide any incentive for the combination.

The second part of the rationale is that the HCN will also be desulfurized therefore more high spec naphtha product will be available. If there are sulfur

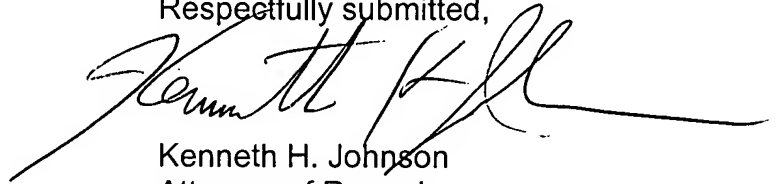
compounds in the HCN, then they will add to the burden of desulfurization, whereas by recycling the HCN to the column, will result in elimination of the sulfur compounds from the recycling HCN and the benefit of maintaining liquid in the catalyst will be achieved without the added processing burden. Furthermore, the rationale implies the initial separation of the LCN from the HCN (they were in one stream originally) was a needless exercise by the refiners. Why separate the two fractions, just leave them together? Clearly the standard practice of separating the cracked naphtha into LCN and HCN is the initial processing step and the recombining of these fractions must have a stronger rationale than that which could have been achieved without the separation, for that is what the examiner is proposing. It is well settled that a rejection based on § 103 must rest upon a factual basis rather than conjure or speculation. "Where the legal conclusion of [of obviousness] is not supported by the facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967); see also *In re Sporck*, 301 F.2d 686, 690, 133 USPQ 360,364 (CCPA 1962).

Moreover, the proposed combination does not meet the claims of the present invention and does not rise to the level of a *prima facie* case. It appears that the proposed reasons for the combination are not based on any evidence or art, but are based on personal knowledge of the examiner, and applicants demand an affidavit as to that information under 37 CFR 1.104(d)(2) or withdrawal of the reliance based thereon. See *In re Lundberg*, 244 F.2d 543, 551, 113 USPQ 530, 537 (CCPA 1957) (examiner's statement accepted as true in light of appellant's failure to question its

accuracy or to present contradicting evidence); *In re Fox*, 471 F2d 1405, 1406-07, 176 USPQ 340, 341 (CCPA 1973) (affirming rejection under 35 USC § 103 without citation of any prior art based on statements that were unchallenged by the appellant).

Reconsideration of the amended claims and the comments presented above is solicited and allowance in due course is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Kenneth H. Johnson', with a long horizontal flourish extending to the right.

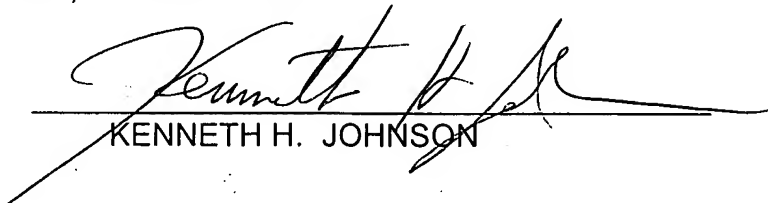
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